IN THE CLAIMS:

Please amend the claims as shown in the following listing of claims, which replaces all prior versions and listings of claims in the application:

1. (Currently amended) A method of etching a substrate in a process chamber comprising a wall, the method comprising:

providing a substrate in the process chamber, the substrate having a surface;

introducing an etching gas into the process chamber;

applying an RF current through a multi-turn antenna covering a top surface of [[a]] the chamber wall to pass RF energy through the chamber wall to the etching gas inside the process chamber to energize the etching gas to etch trenches in the substrate;

detecting radiation reflected from the substrate from directly above the surface of the substrate after the radiation propagates through the chamber wall; and

evaluating the detected radiation to monitor the depth of a layer being etched on the substrate.

2. (Previously presented) A method according to claim 1 comprising energizing the gas by powering a multi-turn antenna comprising a spiral coil.

3. (Currently amended) A method according to claim 2 wherein the multi-turn antenna covers a portion of a chamber wall comprising a ceiling of the process chamber and is non-vertical.

4. (Currently amended) A method according to claim [[2]] 3 wherein the ceiling comprises a ceramic that is permeable to RF energy.

5. (Currently amended) A method according to claim 1 wherein the radiation propagating through the chamber wall comprises an optical beam.

6. (Currently amended) A method according to claim 1 wherein the chamber wall comprises a window that (1) faces the substrate, (2) is permeable to X-rays, (3) is permeable to an optical beam, (4) comprises one or more of silica, sapphire or quartz, (5) is removable from the chamber wall, or (6) is permanently affixed about an opening in the chamber wall.

7. (Currently amended) A method according to claim 1 comprising monitoring radiation propagating through the chamber wall with a process monitoring assembly, and wherein the process monitoring assembly (1) is housed in an enclosure above the chamber wall, (2) is adapted to be mounted above a window in the chamber wall, (3) is mounted to allow line-of-sight view of the substrate in the process chamber, (4) is responsive to radiation, or (5) comprises an interferometer.

8. (Currently amended) A method according to claim 1 comprising monitoring radiation propagating through the chamber wall with a process monitoring assembly comprising a signal source, a signal detector, a collimating assembly and a radiation transmission cable connecting the collimating assembly to the signal source and signal detector, the radiation transmission cable having a bifurcated end.

9. (Original) A method according to claim 8 comprising connecting a first branch of the bifurcated end to the signal source and a second branch of the bifurcated end to the signal detector.

10–90. Cancelled

91. (Currently amended) A method according to claim 1 comprising applying an RF current through a multi-turn antenna above ~~an external~~ a top surface of a portion of a chamber wall comprising a ceiling of the process chamber facing the substrate to inductively couple the RF energy through the portion of the ceiling of the process chamber to the gas inside the process chamber to energize the gas.

92. (Currently amended) A method according to claim [[1]] 91 comprising directing radiation onto the substrate surface from directly above the surface of the substrate and through the ~~external~~ top surface of the portion of the ceiling of the process chamber.

93. (Previously presented) A method according to claim 92 comprising detecting radiation reflected from the substrate from directly above the surface of the substrate after the radiation propagates through a window in the portion of the ceiling facing the substrate.

94. (Previously presented) A method according to claim 1 comprising collimating the detected radiation and evaluating the detected collimated radiation to monitor the depth of a layer being processed on the substrate.

95. (Currently amended) A method according to claim 1 comprising powering an antenna covering a portion of the chamber wall ~~of the chamber~~ to couple the RF energy to gas in the chamber.

96. (Currently amended) A method according to claim 1 wherein the chamber wall ~~of the process chamber~~ comprises ~~an external~~ a top surface that is above the substrate, and wherein the method comprises coupling RF energy across a substantial portion of the ~~external~~ top surface to the gas in the chamber.

97. (Currently amended) A method according to claim 96 wherein the process chamber comprises a multi-turn antenna above the ~~external~~ top surface, and wherein the method comprises coupling RF energy thorough the ~~external~~ top surface by powering the multi-turn antenna.

98. (Currently amended) A method according to claim 1 wherein the chamber wall ~~of the process chamber~~ is at least partially covered by a multi-turn antenna, and the chamber comprises a cathode within the chamber, and wherein the method comprises coupling RF energy to the gas in the chamber by applying RF currents to the cathode and multi-turn antenna.

99. (Currently amended) A method according to claim 1 wherein the chamber wall ~~of the process chamber~~ is a flat wall and a multi-turn antenna at least partially covers the flat wall, and wherein the method comprises coupling energy across the flat wall to the gas in the chamber by powering the multi-turn antenna.

100. (Currently amended) A method according to claim 1 wherein the chamber wall ~~of the process chamber~~ comprises a ceiling, and wherein the method comprises monitoring radiation from above the ceiling.

101. (Previously presented) A method according to claim 1 comprising coupling RF power to the gas by powering a non-vertical multi-turn antenna comprising a coil that spirals radially inward.

102. (Previously presented) A method according to claim 1 comprising coupling RF power to the gas by powering a non-vertical multi-turn antenna comprising a coil having separate turns, each turn having a different radius.

103. (Currently amended) A method according to claim 1 comprising detecting radiation propagating through a chamber wall comprising a ceramic.

104. (Previously presented) A method according to claim 103 wherein the ceramic comprises alumina or silica.

105. (Previously presented) A method of etching a substrate in a process chamber, the process chamber comprising a wall and having a non-vertical multi-turn antenna above the wall, the method comprising:

placing in the process chamber, a substrate having a layer;

introducing an etching gas into the process chamber;

powering the non-vertical multi-turn antenna covering a top surface of a chamber wall to couple energy through the wall to the etching gas inside the process chamber to energize the etching gas to etch the layer on the substrate;

detecting radiation reflected from the substrate from directly above the surface of the substrate after the radiation propagates through the wall; and

evaluating the detected radiation to monitor the depth of the layer being etched on the substrate.

106. (Previously presented) A method of etching a substrate in a process chamber, the process chamber comprising a ceiling and a multi-turn antenna above the ceiling, the method comprising:

providing a substrate in the process chamber, the substrate having a surface;

introducing an etching gas into the process chamber;

applying an RF current to the multi-turn antenna to pass RF energy through the ceiling of the process chamber to the etching gas inside the process chamber to energize the etching gas;

detecting radiation reflected from the substrate from directly above the surface of the substrate after the radiation propagates through the ceiling; and

evaluating the detected radiation to monitor etching of the substrate.